STI Vibration Monitoring Inc.

Vibration Monitoring and Machine Protection Systems

1010 East Main Street, League City, TX 77573 Phone:281.334.0766 Fax: 281.334.4255
www.stiweb.com / www.stiwebstore.com

Condition Monitoring Custom Products

CMCP-810 Runout Measurement Kit
Quick Start Guide

To successfully use the runout kit it is necessary to have a good working knowledge of the Fluke Scopemeter. It is recommended that the user carefully review the oscilloscope manual before making runout measurements. Knowledge of how to set up channel and trigger parameters and how to save these setups and waveforms is required. Other functions such as Scope Record and PC/ Printer interface are useful in this application and should be studied.

Proximity Probe Installation and Setup:

- Place the -24 VDC Power Supply, CMSS68 Proximity Probe, CMSS958 Probe Extension Cable, and CMSS668 Proximity Probe Driver near the testing location.
- The -24 VDC power supply requires a source of either 115 VAC or 230 VAC.
- Connect the "-V" terminal of the -24 VDC Power Supply to one of the "-24V" terminals on the CMSS668 Proximity Probe Driver.
- Connect the "+V" terminal of the -24 VDC Power Supply to one of the "SIG" terminals of the CMSS668 Proximity Probe Driver.
- Mount the CMSS68 Proximity probe at the desired measurement location along the shaft using a Magnetic Base Goose-Neck and set the initial gap such that the driver output is approximately -10 VDC.
- Connect the BNC-to-Bare-Wire Adapter to the CMSS668 Proximity Probe Driver. The white lead connects to the "SIG" terminal, and the black lead connects to a "GND" terminal.
- Use a BNC Extension Cable to connect the CMSS Proximity Probe Driver and BNC Adapter to the "Channel A" input of the Oscilloscope.

Optical Phase Pickup Installation and Setup:

- Mount the Optical Pickup in a Magnetic Base Goose-Neck at a second location along the shaft.
- Connect the Optical Pickup to the Interface Module.
- The Interface Module can be run on charged batteries or plugged into the AC power adapter.
- Place a 1/2" piece of Reflective Tape on the shaft at the location to be viewed by the Optical Pickup.
- When the Optical Pickup passes over the Reflective Tape, the green LED on the back of the Optical Pickup will light up, and the Interface Module will output a 0-5 VDC TTL pulse determined by the width of the Reflective Tape.
- Adjust the Optical Pickup and Magnetic Gooseneck until rotation of the shaft and Reflective Tape results in positive green LED indication.
    - Note: The Optical Pickup will only detect rotation in a single direction determined by the first pass of the Reflective Tape.
- Use a BNC Extension Cable to connect the Optical Pickup Interface Module BNC output to the "Channel B" input of the Oscilloscope.

1010 East Main Street, League City, TX 77573 Phone:281.334.0766 Fax: 281.334.4255
www.stiweb.com / www.stiwebstore.com

Oscilloscope Setup and Operation:

- Power on the -24 VDC Power Supply, Optical Pickup Interface Module, and the Oscilloscope.
- Channel A Setup:
    - Press the “A” button to enter Channel A Setup.
    - Set the pop-up menu “INPUT A” to “ON” using the “F1” button.
    - Set the pop-up menu “COUPLING” to “DC” using the “F2” button.
    - Set the pop-up menu “PROBE A” to “Voltage and 1:1” using the “F3” button.
    - Press the “CLEAR MENU” button when finished.
    - Press the Channel A “RANGE” button to achieve a range of 200 or 500mV.
- Channel B Setup:
    - Press the “B” button to enter Channel B Setup.
    - Set the pop-up menu “INPUT B” to “ON” using the “F1” button.
    - Set the pop-up menu “COUPLING” to “AC” using the “F2” button.
    - Set the pop-up menu “PROBE B” to “Voltage and 1:1” using the “F3” button.
    - Press the “CLEAR MENU” button when finished.
    - Press the Channel A “RANGE” button to achieve a range of 5V.
- Time Setup:
    - Press the “TIME” button to achieve a range of 500ms to 2s depending on rotation speed. You want to be able to capture an entire revolution in one screen.
- Press the Channel A “MOVE” and Channel B “MOVE” buttons to establish a distance between the two plots so that they do not overlap.

Runout Measurement:

- Slowly rotate the shaft so that at least one revolution is captured on the screen.
- Press the “SAVE PRINT” button to capture the screen.
- Press the “SAVE” button on the pop-up menu using the “F1” key.
- Use the Arrow Keys to highlight “SCREEN + SETUP” 1-10 and press the “SAVE” pop-up menu button using the “F4” key.
- To recall the saved screen press the “SAVE PRINT” key and select “RECALL” on the pop-up menu using the “F2” key. Use the Arrow Keys to highlight the desired screen and press “F4”.
- Consult the User’s Manual CD enclosed in the Oscilloscope’s “Quick Start” guide for printing and data transfer.
- To measure the shaft runout press the “CURSOR” button.
- Use the “F1” key to select “=“ for parallel horizontal lines.
- Use the “UP” and “DOWN” arrow keys to position the top cursor to the highest peak on the Channel A plot.
- Press the “F2” key to select the other cursor and use the “UP” and “DOWN” arrow keys to position the other cursor to the lowest peak on the Channel A plot.
- The runout voltage difference is visible on the top left of the screen. This correlates to the 200mV/mil output of the Proximity Probe System.

1010 East Main Street, League City, TX 77573 Phone:281.334.0766 Fax: 281.334.4255
www.stiweb.com / www.stiwebstore.com

Correction of Common Oscilloscope User Errors:

- In the event that the Oscilloscope is not functioning properly the easiest solution is to reset back to Factory Default Settings and perform the Oscilloscope Setup from the beginning.
- Press the "USER" button open the User Options Menu.
- Use the Arrow Keys to highlight "Factory Default".
- Press "ENTER" using the "F4" key.
- Note: This will erase all saved screens.
- Repeat the Oscilloscope Setup on the previous page.

Surface Irregularities:

Surface irregularities or imperfections will appear on an oscilloscope as sharp voltage spikes superimposed on the dynamic waveform.

Surface irregularities such as scratches, pitting, burrs, etc. will produce a runout condition as observed by the eddy probe sensor.

In general, surface irregularities are created due to improper handling of the rotor during the manufacturing or repair cycle. Care should be taken to protect the shaft surface to be used for dynamic motion measurements. In essence, these surface areas should be given the same protective measures used to protect a bearing journal surface. Crane lifts should be made with cables attached to shaft areas away from the probe measurement surfaces. Support fixtures for storage of rotors should not introduce surface scratches, dents, etc.

Occasionally, surface irregularities are introduced via a machine-cutting tool. If the tool is dull or the feed is too rapid, some tool chatter may occur which can introduce small ripples in the shaft surface.

Electrical Runout:

Eddy probes will operate in the presence of magnetic field, as long as the field is uniform or symmetrical and not localized to a particular location on the rotor. Electrical runout will be present if a particular area of the shaft surface is highly magnetic, and the remaining surface is nonmagnetic, or at a much lower value. This is due to the resultant change in sensitivity on the shaft surface to the applied field from the eddy probe sensors.

Residual Stress Concentrations:

Observation of residual stress concentrations on an oscilloscope will yield a sinusoidal waveform with high voltage, high frequency spikes superimposed on the waveform.

During manufacturing and repair of rotors, a variety of machining and surface treatment processes can introduce small amounts of localized stress concentrations. Although these stress areas do not adversely affect the mechanical properties of the rotor, they may give rise to an electrical runout from the proximity transducers. Since one of the variables affecting voltage output from the transducer is the resistivity of the observed shaft surface, any deviation of the resistance around the circumference of the shaft (due to varying stress levels) will produce a voltage change.